US-PAT-NO: 5146346

DOCUMENT-IDENTIFIER: US 5146346 A

TITLE: Method for displaying and printing multitone images
derived from grayscale images

DATE-ISSUED: September 8, 1992

INVENTOR-INFORMATION:

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APPL-NO: 07/ 715502

DATE FILED: June 14, 1991

US-CL-CURRENT: **382/167**, 358/500 , 382/162

ABSTRACT:

The method of displaying multitone images beginning with a grayscale original image capable of displaying a specific number of gray levels, which includes the steps of: (1) selecting a plurality of colors from the image, one for each of the multitones, each having a color value; (2) selecting a plurality of transfer functions, one for each of the selected colors; (3) converting each of the shades of gray, using the respective color values and the transfer functions, into a new color value; and (4) displaying the

resultant multitone image on a video display terminal using the new color values in place of the shades of gray. The displayed image may be printed using one printing plate for each of the selected colors, and using the same transfer functions to convert the shades of gray to new gray values which are subsequently converted into halftone dots for each printing plate.

3 Claims, 5 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 3

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Brief Summary Text - BSTX (4):

The use of multiple inks increases the number of distinct grayscale gradations possible, thereby increasing the tonal range of the resulting printed image. Duotones were originally created with black and gray inks. The black ink was used to capture the detail in the shadows; the gray ink was used to represent the **midtones** and highlights. In modern printing processes, however, duotones often use a black ink and a colored ink such as a Pantone. This mixture provides the duotone with a slight tint in addition to the increase in tonal range provided by the duotone process.

Detailed Description Text - DETX (6):

As shown in FIG. 1, each ink has its own tonal curve. Black ink 1 has tonal curve 10; Pantone 321 ink 2 has tonal curve 12. These curves allow the user to map a given ink density input value, shown on the X-axis of the graph in FIG. 2, against the specified ink density output value plotted along the Y-axis. Referring to FIG. 2, for example, an input ink density value along the X-axis of 50% (commonly called a **midtone**) is mapped to an output density value along the Y-axis of about 25%. These percentages are shown in the table in FIG. 2 to the right of the duotone filter curve. Note in the box 20, representing an input value of 50%, that the mapped output ink value is 25%. This means that the colored Pantone 321 printer plate associated with this duotone filter curve will have **midtones** that are lighter (or less dense) than those in the grayscale original. The grayscale original **midtones,** by definition, have a density of 50%; the colored printer plate, on the other hand, will have a Pantone 321 ink density of only 25%. Thus this ink has been deemphasized.

Detailed Description Text - DETX (9):

Referring to FIG. 2, for example, where the user desired to de-emphasize the Pantone 321 ink, the percentages in the table shown in FIG. 2 for the output values were reduced from the input values. As discussed above, for example, the **midtone** for Pantone 321 (50%) was reduced in an output value of 25%. Alternatively, had the operator decided to give the Pantone 321 color more

emphasis, a reverse curve could have been used. For example, the **midtone** 50% input value could have been raised in the output value to 60 or 80%. This would have provided more emphasis for the Pantone 321 color at the **midtone** level. The operator, if she desired, could draw or adjust the desired curve using a computer "mouse" and have the computer calculate the values to go into the boxes at the right. For example, referring to FIG. 3, the operator could move the cursor, using the mouse, to point to reference numeral 25 and pull the curve upwardly. He similarly could move the cursor to point to reference numeral 26 and pull the upper part of the curve downwardly. The filter curve 27 resulting from those moves is shown in FIG. 4.

Current US Original Classification - CCOR (1):
382/167